

8CL5989
(GP1-0035)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Thomas Gohr et al.)
Serial No.: 09/749,645) Group Art Unit: 1714
Filed: December 27, 2000)
For: METHOD FOR REDUCING HAZE IN A) Examiner:
FIRE RESISTANT POLYCARBONATE) Szekely, Peter A.
COMPOSITION)

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Box AF
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Rajendra K. Singh, declare and state:

1. My educational background includes a B.S. in Chemistry from Bombay University, India, Masters of Science in Organic Polymer Chemistry from Virginia Commonwealth University and a Ph.D. in Chemistry from the University of Missouri-Rolla in Organic Polymer Chemistry.

2. I have been employed by the General Electric Company since October 1998, where I am currently a Product Engineer in the Lexan Technology Group at General Electric Plastics in Mount Vernon, Indiana.

3. I am an inventor or co-inventor on at least 2 U.S. patents assigned to the General Electric Company relating to plastic compositions, methods, and articles.

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4. I am an inventor of the invention claimed in the above-identified application.

5. I designed and supervised the preparation and testing of six compositions, which are shown in Table 1. The compositions comprise polycarbonate resin, 0.08 parts per hundred (phr) of the flame retardant salt potassium salt of perfluorobutane sulfonate (KPFBS) and a variable amount of cyclic siloxane from 0.05 to 2 phr based on total weight of the composition as shown in Table 1.

6. Five samples of each composition were prepared and tested according to the procedures described in the above-identified application. Samples were subjected to tensile testing as per ASTM D 638-99 to determine the modulus, maximum stress at yield and break, and elongation at yield and break. Samples were tested for Notched Izod impact strength as per ASTM D 256. Flexural Modulus and flexural strength were measured as per ASTM D 790. Heat distortion temperature (HDT) was measured as per ASTM D 648. The results of the tests have been averaged and are reported in Table 1.

7. As can be seen in Table 1, almost all mechanical properties such as the flexural modulus, secant modulus, flexural strength, flex stress at 5% strain, impact strength, ductility, impact energy, ratio of energy to maximum load, and tensile properties show virtually no change with the increase in the amount of cyclic siloxane. The average values for all of these mechanical properties are almost identical within the limits of statistical variation, irrespective of the amount of cyclic siloxane. Further there is no observable trend in the mechanical properties, especially in the impact strength, with the increase in the amount of cyclic siloxane.

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8. The only properties that show any trends that are dependent upon the amount of cyclic siloxane are the melt volume rate at 18 minutes and 6 minutes as well as the heat distortion temperature (HDT) test and the softening temperature derived from the Vicat test (ASTM D 1525). While the melt volume rate increases with the increase in cyclic siloxane content indicating a reduction in viscosity, it can clearly be seen that the HDT test and the Vicat test show a reduction in the softening temperature with increasing siloxane content. Such a reduction in softening temperature is detrimental to a flame retardant composition since it is generally desirable to have deformation occur at as high a temperature possible when heated or subjected to a flame. Thus from the above data, it is quite clear that the addition of the cyclic siloxane to the flame retardant polycarbonate composition containing a flame retardant salt does not improve the impact properties, but instead causes a decrease in the softening temperature of the composition which is generally undesirable.

9. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like, so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

OCT 24 2002
Dated

Rajendra Kashinath Singh
Rajendra K Singh, Ph.D.

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TABLE 1						
Sample No.	1	2	3	4	5	6
FR Salt Loading (phr)	0.08	0.08	0.08	0.08	0.08	0.08
Cyclic Siloxane Loading (phr)	0.05	0.1	0.25	0.5	1	2
Properties	Units					
Melt Volume Rate/ 18 min.	cm ³ /10 min	11.68	13.17	13.19	14.59	15.26
Melt Volume Rate/ 6 min.	cm ³ /10 min	11.32	12.68	12.76	13.8	14.88
Flexural Modulus	PSI	337000	343000	339000	344000	343000
Secant Modulus@2%Strain	PSI	325000	327000	324000	329000	327000
Flexural Strength	PSI	14600	14500	14500	14600	14600
Flex Stress@5%Strain	PSI	13100	13000	13000	13100	13000
HDT Temperature	°C	127.4	126	126.9	125.2	124.7
Ductility	%	100	100	100	100	100
Impact Strength	lb/in	16.463	16.004	16.463	15.745	15.837
Ductility	%	100	100	100	100	100
Drop Velocity	ft/s	11.72	11.72	11.72	11.73	11.72
Impact Energy	ft-lbf	106.8	106.8	106.8	106.9	106.8
Energy to Max Load	ft-lbf	52.2	52.4	52.5	53.3	54
Total Energy	ft-lbf	56.2	56.6	56.5	57.2	58
Max Load	lbf	1580	1610	1610	1610	1610
Tensile Modulus	PSI	336000	339000	334000	337000	337000
Tensile Stress@Yield	PSI	8920	8900	8920	8900	8910
Tensile Stress@Break	PSI	9920	10300	10100	9660	10000
Tensile Elongation@Yield	%	6.36	6.2	6.28	6.3	6.22
Tensile Elongation@Break	%	126.42	134.52	142.1	144.18	147.22
Cdn: Specimen Thickness (125 mils)	p[FTP]	0.9935	0.9558	0.967	0.9406	0.9036
Vicat Temperature	°C	142.9	142.5	142.8	141.9	141.5
Yellowness Index	-	2	1.5	1.5	1.4	1.4
Transmission	%	90.2	90.7	90.8	90.8	90.5
Haze	%	1.5	1	0.8	0.8	1.2